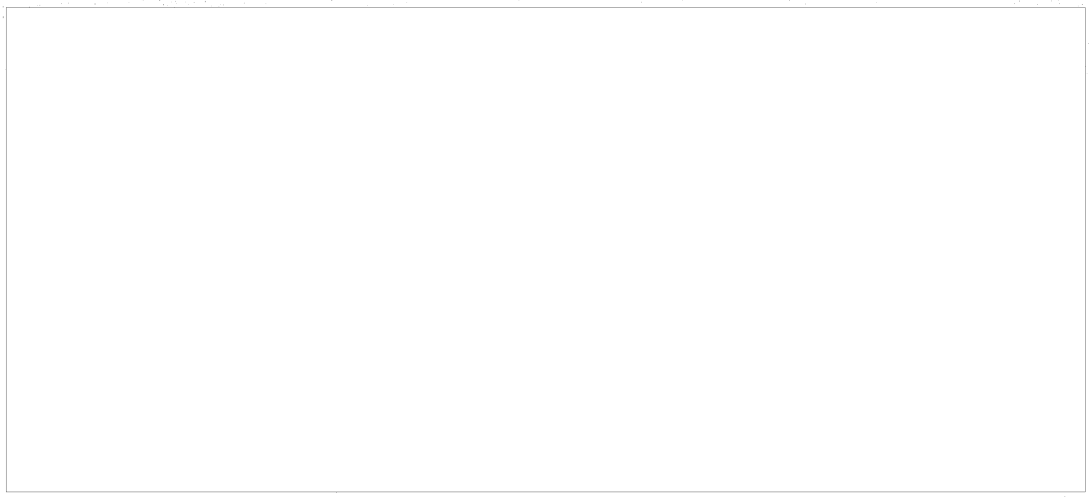

STAT

MEASUREMENT OF LOW VAPOR PRESSURES AT HIGH TEMPERATURES

II. THE PRESSURE OF TIN VAPOR

A. Granovskaya, A. Lyubimov
Moscow Steel Institute
Chair of General Chemistry, Chair of Physics
Submitted 22 July 1947

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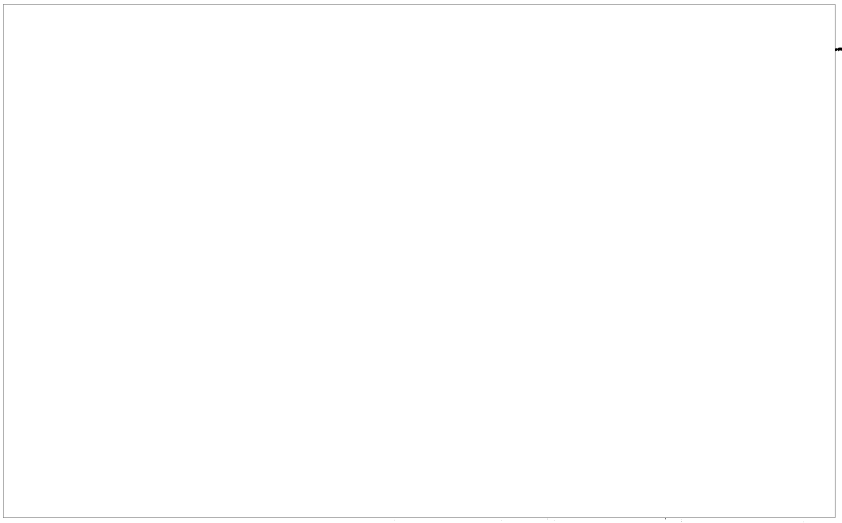

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A comparatively large number of investigations connected with the experimental determination of the vapor pressure of metallic tin has been conducted. The earlier investigations of Greenwood [1], Mott [2], Wartenberg [3], and the later ones of van Liempt [4] and of Ruff and his associates [5, 6] included the temperature range from the boiling point (2260 to 2280°C) to 1200°C. These data are shown in Fig.1. They are marred by large discrepancies between the values established by the various researchers, which are unusual even for determinations of vapor pressures of high-melting metals which can be measured only highly inaccurately. Thus, Wartenberg gives a figure of 1.5 mm for 1360°C, while van Liempt quotes 162 mm for 1282°C. In the lower temperature range there is only one value, at 1010°C, measured by Johnston [7] with an ionization manometer graduated like a MacLeod manometer.

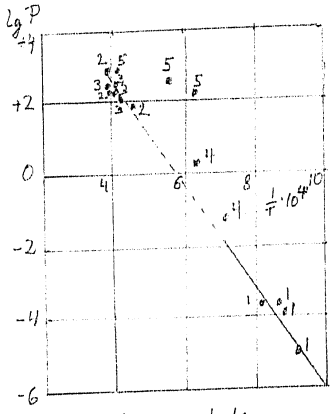
We wanted to measure the vapor pressure of tin more exactly and at lower temperatures. For that purpose, we took advantage of a method we developed and which is described in the previous report [8] for measuring the vapor pressure of bismuth in a temperature range from 470 to 700°C. However, at 500°C, tin has such low vapor pressure, that measuring it with any accuracy by the previously developed method was impossible. We measured the vapor pressure of tin in the range from 730 to 950°C. For this purpose, several design changes were introduced into the described apparatus.

... The output of the inductor was increased by introducing a rectifier assembly into the high-frequency furnace. With small dimensions of the crucible, the output absorbed by the fusing metal was very small, so that high temperatures could not be reached. In order to increase the temperature, the diameter of the inductor coil was decreased. This increased the current density and thus also the temperature. Reduction of the diameter of the inductor required modification of the experimental lamp. The spherical envelope was changed to a cylindrical one, while its internal volume remained unchanged. Fig. 2 shows the experimental lamp tube.

The data obtained in the measurements are shown in the table. They are also included in Fig. 1.

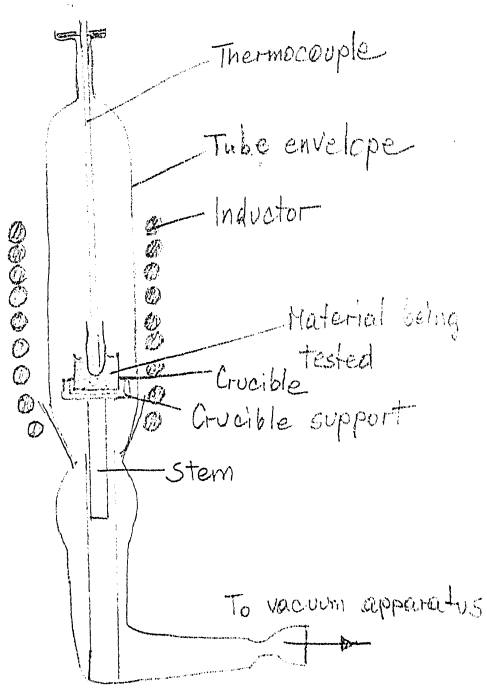
t °C	T °K	P mm Hg
730	1003	$1.42 \cdot 10^{-6}$
812	1085	$7.51 \cdot 10^{-5}$
880	1153	$1.73 \cdot 10^{-4}$
890	1163	$2.32 \cdot 10^{-4}$
940	1213	$3.01 \cdot 10^{-4}$

Fig. 1



1- our data
2- Greenwood
3- Ruff & Mugdan
4- Wartenberg
5- Van Liempt

Fig. 2



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